

in the direction shown in the figure about a vertical axis. This, as we have seen, is the spin which produces a slice. The same spin would be produced if the motion of the club was along LM and the face turned so as to be in the position shown in Fig. 29, *i.e.* with the heel in front of the toe.

If the motion and position of the club were as in Figs. 30 and 31, instead of as in Figs. 28 and 29, the same consideration would show that the spin would be that possessed by a pulled ball.

### THE SECOND FRENCH ANTARCTIC EXPEDITION.<sup>1</sup>

THE Antarctic is so vast as to admit of many expeditions working together with good results, and Dr. Charcot therefore resolved to return to the region which he had explored to some extent in 1903-5. His precise object was to investigate from every point of view as great an extent of the Antarctic as possible, without any considerations as to latitude. He desired to enter the region where the ice drifted furthest to the north, and he had no hope whatever of reaching the Pole. He had a three-masted vessel constructed at St. Malo, with auxiliary engine, which he named *Le Pourquoi Pas?* It was equipped with every care, and supplied with the most modern instruments for observation. The crew consisted of twenty-two men, most of whom had already accompanied Dr. Charcot on his previous expedition. The staff consisted of seven, who were experts in different departments of science. The expedition started from Havre on August 15, 1909, and on December 16 left Punta Arenas for the Antarctic.

After passing Deception Island Dr. Charcot made for Port Lockroy, in Gerlache Strait, where the work of the expedition began. Some days later the expedition arrived at Wandell, which was found to be a very unsatisfactory harbour, and therefore the expedition moved on to Petermann Island. Dr. Charcot with two of his companions set out to discover if it was possible to pass between the Biscoe Islands and the coast. As they expected to return the same day they did not take any provisions or change of garments. Their return was blocked by the ice, and it was four days before they were able to reach the ship, narrowly escaping death from hunger and cold. From Petermann Island a journey was made towards the south along the coast, the mapping of which, begun during the previous expedition, was completed. A hydrographical survey was made of Adelaide Island, which was found to be seventy miles long instead of eight, as had previously been stated. To the south of Adelaide, in a region which had not previously been visited, a great gulf was discovered which was entitled Marguerite Bay. Here the greatest difficulties were met with from the ice and from icebergs, but these were successfully overcome. In spite of all the difficulties the expedition discovered and studied the hydrography of 120 miles of unknown coast to the south.

At last, after two attempts, the expedition succeeded in traversing the ice and reaching Alexander Land, which was mapped, and the hydrography of which was investigated. It was found absolutely impossible to winter here, however, and the expedition was compelled to return to Petermann Island. Observations, however, were carried on with great perseverance, numerous soundings and dredgings were made, and many photographs taken. The house which had been constructed here on the previous expedition was still available, and after three days' work was put into condition for being able to be used during the winter. In the autumn numerous and long excursions were made on the glaciers. The winter, though mild, was almost continuously stormy, a formidable north-east wind blowing during nine months. An immense quantity of snow fell. The terrible season was very trying to the members of the expedition, some of whom had been attacked with scurvy.

An attempt was made to traverse Graham Land. The members of the expedition who carried out the work returned with many interesting observations, but without

having been able to overcome the impassable perpendicular wall of granite and of ice which lines the whole of the coast where a landing was attempted to be made. Many other excursions were made in the neighbourhood. With great difficulty, owing to the state of the ice, Deception Island was reached at the end of November, and the expedition received the greatest hospitality from the whalers who are settled on the island. Many observations were here made in seismography, on the tides, on hydrography, in natural history and geology, and many soundings and dredgings were carried out.

After the expedition had been refitted it visited Bridgman Island, Admiralty Bay, the south coast of the South Shetlands, at all of which places good work was done. After this another attempt was made to penetrate southwards. In spite of the unfavourable condition of the ice and the weather, the expedition succeeded in passing beyond all the latitudes previously reached to the south-west of Alexander Land. It was hoped that the expedition would be able to make further discoveries to the south and the west of Alexander Land, but the formidable condition of the pack rendered this extremely difficult. The route, however, was continued along the edge of the pack, when Peter 1st Island was discovered in the place at which it is usually charted. After this the icebergs became so numerous as to be embarrassing and dangerous. Dr. Charcot reckons that they counted something like 5000 of these in one day. However, they succeeded in reaching 126 degrees west longitude, and so reached two or three degrees further south than the route followed by Cook and Bellingshausen. As the supply of coal was now almost exhausted, and the health of the expedition had become alarming, it was decided to make for the north. The icebergs gradually diminished, and at last disappeared, and, thanks to an uninterrupted series of strong winds, varying from south-west to N.N.W., rapid progress was made. In ten days the Straits of Magellan were reached, and on February 12 the expedition anchored at Punta Arenas. The *Pourquoi Pas?* behaved admirably in spite of the many trials to which it was subjected, and the crew was all that could be desired, while the scientific staff worked incessantly, and from the scientific point of view the programme was scrupulously carried out. It will take many months to work out the observations which have been made during the expedition, to study and arrange the rich collections obtained, and therefore it is somewhat difficult to give more than a brief *resume* of the results obtained.

From the geographical point of view the expedition has proved that the west coast of what may be called the South American Antarctic is cut up by deep fjords, and the coast studded with islands and reefs. Graham Land is continued to the south by a land to which Dr. Charcot has given the name *Terre Loubet*; this is continued by the *Terre Fallières*. Alexander Land, which has only been seen by Bellingshausen, is a large island, but the lands discovered by the expedition to the south and west of that very probably join on *Terre Fallières*. Outside of Peter 1st Island the expedition did not obtain sight of any other land, but their soundings in continuation of those of the Belgian expedition, the configuration of the icebergs and their movements, seem to indicate that there exists a continual line, which most probably joins the Graham Land section of the Antarctic to King Edward VII. Land. Dr. Charcot considers that the further exploration of this land is very desirable, although the difficulties from the state of the weather and the formidable nature of the ice here will render such an enterprise extremely difficult.

In spite of the difficulties which had to be faced, the observations made in the various departments of science are extremely rich. Careful mapping of the lands visited was carried out throughout; numerous gravity observations were made; earthquake phenomena recorded; an eclipse of the sun on December 23, 1908, was observed; important geological observations carried out, proving that the same dioritic and granitic forms which are to be found in Graham Land are continued further to the south. Of the existence of a continental plateau there can be little doubt from the observations that were made. Numerous excursions were made on the glaciers into the interior; careful continuous meteorological observations were re-

<sup>1</sup> Summary of a paper by Dr. J. B. Charcot read before the Royal Geographical Society on December 19.

corded; 100 soundings were made; 200 specimens of the water collected; twenty dredgings were carried out; observations of interest in magnetism, in solar radiation, zoological and botanical collections, and additions to our knowledge in other directions, rendering the expedition from the scientific point of view completely successful.

### COMPARISONS OF JURASSIC FLORAS.

AT the forty-ninth annual meeting of the Yorkshire Naturalists' Union, held at Middlesbrough on Saturday, December 17, Prof. A. C. Seward, F.R.S., delivered his presidential address, entitled "The Jurassic Flora of the East of Yorkshire in Relation to the Jurassic Floras of the World." It was pointed out that the estuarine beds of east Yorkshire were among the most famous and important strata of the world from the point of view of their fossil contents. Since the publication in 1822 of Young and Bird's "Geological Survey of the Yorkshire Coast" much attention has been paid to the fossil plants of Yorkshire by British and foreign students. During the first half of the nineteenth century a considerable amount of work was done by such pioneers as William Bean, John Williamson, W. Crawford Williamson, John Phillips, and others. Prof. Seward gave a general sketch of the flora which the labours of Yorkshire naturalists have enabled students to investigate. Prof. Nathorst, of Stockholm, who has more than once invaded our shores, recently transported a portion of our island to his country. By establishing a department devoted to the floras of the past, the Swedish Academy has set an example which the trustees of our national collections would do well to imitate. Palæobotany is still without a representative in the British Museum!

Prof. Seward then reviewed the various fossil remains of Algae and Fungi, Hepophyta, Equisetales, Lycopodiales, Filicales, Gymnospermæ, Ginkgoales, and Coniferales, being some of the types which occur in the Yorkshire strata. The Yorkshire coast flora is characterised by the abundance of ferns and cycads and certain types of conifers, though as yet it is not possible to make any statement as to the relative abundance of these different groups. It is also probable that the Ginkgoales played a fairly prominent part in the composition of the vegetation. The most interesting fact in regard to the Jurassic ferns is that they afford strong presumptive evidence in support of the view that their nearest living allies are to be sought in the southern hemisphere. As regards the cycads, comparison with recent genera is rendered more difficult because of the greater gulf between recent members of the group and those which flourished in the Jurassic era. There can, however, be no reasonable doubt that the cycads of to-day are derived from an ancient stock which produced also *Williamsonia* and other Jurassic genera. Here, again, the recent plants most nearly akin to those of the Mesozoic floras are chiefly characteristic of southern and warmer regions. The same general statement is applicable to the relation of some of the Jurassic conifers to recent types. Finally, in the genus *Ginkgo* of the Jurassic flora we have a member of a group which would probably have ceased to be represented among living plants were it not for the fact that the recent species has been long held in veneration in the Far East as a sacred tree. With these southern forms there grew in profusion stalwart *Equisetums*, which afforded one of the few instances of a genus still represented by several species in the British flora which can claim a Jurassic ancestry.

At first sight one might be tempted to infer that there is clear evidence of a tropical, or at least subtropical, climate in Jurassic Europe. This would, perhaps, be a correct conclusion, but it is one which cannot be confidently made, so far, at least, as the botanical evidence is concerned. The fact must be borne in mind that among living plants very closely allied types, or even one of the same species, may flourish under widely different climatic conditions, as in the case of our own familiar bracken fern, which appears to be equally at home on the Yorkshire moors, in Tasmania, Abyssinia, and elsewhere. The comparison of a past with a recent flora is bound up with numerous considerations in addition to those connected with the comparison of existing and extinct species.

During the Rhætic and Jurassic eras, and in the succeeding Cretaceous and Tertiary epochs, the genus *Ginkgo* was very widely distributed in Europe. So recently as the Lower Tertiary period it existed in what is now the west of Scotland in a form hardly distinguishable from the maiden-hair tree. Are we justified in assuming that the living species is a safe criterion as regards power of resistance or capabilities of life with which the family was endowed at the zenith of its vigour? Were it possible to learn from the maiden-hair tree what vicissitudes its ancestors passed through since the days of the Jurassic period, we might hear of unequal competition and gradual migration from northern to southern latitudes.

In dealing with the relation of the Yorkshire Jurassic flora with that of other parts of the world, it is remarkable to find that almost precisely similar plants to those occurring in the local rocks also are found embedded in strata of about the same age at places so far distant as Bornholm, Poland, Turkestan, Siberia, Korea, Japan, Franz Josef Land, Spitsbergen, Greenland, America, India, and Australia. This extraordinary distribution would certainly seem to indicate that the climate in Jurassic times must have been much more uniform the world over than obtains to-day.

As a result of Prof. Seward's address and his interest in the union's work, a committee was formed for the investigation of the Jurassic plants of Yorkshire, with Prof. Seward as first chairman.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

**SHEFFIELD.**—Mr. R. J. Pye-Smith has resigned the professorship of surgery. The council has adopted the following resolution:—"That the resignation of Mr. Pye-Smith as professor of surgery in the University be accepted with great regret. Mr. Pye-Smith, who is the senior member of the teaching staff, has been a teacher of surgery for thirty-four years, first in the old Medical School, next in the University College, and finally in the University, and the council desire to place on record their appreciation of the distinguished services which he has rendered to the cause of medical education in Sheffield."

Dr. E. W. Adams has been appointed to the post of lecturer in materia medica and assistant to the professor of materia medica, pharmacology, and therapeutics.

**DR. W. GOODWIN**, head of the chemical department at the South-Eastern Agricultural College, Wye, has been appointed principal of the Midland Agricultural College, Kingston, Derbyshire.

A REUTER message from Chicago announces that Mr. John D. Rockefeller has made a final donation of 2,000,000*l.* to Chicago University, making a total of approximately 7,000,000*l.* given by him to that institution.

The annual meeting of the Geographical Association will be held on Saturday, January 14, 1911, in the Lecture Hall, London School of Economics. The following short papers will be read:—Geography at seven years, Miss C. von Wyss; map-making as a school subject, F. Beames; practical contouring round a London school, J. Fairgrieve; the training of teachers in geography, J. F. Unstead. An address will be delivered by the president, Mr. Douglas W. Freshfield, and a lecture on "The Highways of England and Wales, Past and Present, and their Relationship to Geographical Conditions," by Mr. G. Montagu.

**LIVERPOOL.**—The Liverpool School of Tropical Medicine (Incorporated) at the time of the death of the late Dr. J. E. Dutton in the Congo Free State, whilst investigating sleeping sickness and other tropical diseases there, started a fund to establish a chair in the University in his memory. The necessary amount has now been raised, mainly through the generosity of the late Sir Alfred Jones, Mr. W. H. Lever, Sir William Hartley, and many others. The Liverpool School has at present a lectureship in tropical entomology, and the committee decided, therefore, that the best form the memorial could take would be the foundation in the University of a Dutton professorship in tropical entomology. The value of close investigation into